271. Proposed by L. E. NEWCOMB, Los Gatos, California.

Sum the series $\frac{a}{b}+\frac{a^3}{3b^3}+\frac{a^5}{5b^5}+\ldots$ to ∞, $b>a$.

I. Solution by A. H. HOLMES, Brunswick, Maine.

Let $S=\frac{a}{b}+\frac{a^3}{3b^3}+\frac{a^5}{5b^5}+$ etc., to infinity, $b>a$.

Put $\frac{a}{b}=c$, then $S=c+\frac{c^3}{3}+\frac{c^5}{5}+$ etc. $\therefore \frac{dS}{dc}=1+c^2+c^4+$ etc.

Let $c^2=e$. Then $\frac{2cdS}{de}=1+e+e^2+e^3+$ etc. $=\frac{1}{1-e}$, $dS=\frac{de}{2c(1-e)}=\frac{dc}{1-c^2}$.

$\therefore S=\frac{1}{2}\log\left(\frac{1+c}{1-c}\right)=\frac{1}{2}\log\left(\frac{b+a}{b-a}\right)$.

II. Solution by J. SCHEFFER, A. M., Kee Mar College, Hagerstown, Md.

Subtracting $\log(1-x)=-x-\frac{x^2}{2}-\frac{x^3}{3}-\frac{x^4}{4}-\ldots$ from $\log(1+x)=+x+\frac{x^2}{2}+\frac{x^3}{3}+\frac{x^4}{4}+\ldots$, we get $x+\frac{x^3}{3}+\frac{x^5}{5}+\ldots=\frac{1}{2}\log\frac{1+x}{1-x}$.

Substituting $x=\frac{a}{b}$, we obtain $\frac{a}{b}+\frac{a^3}{3b^3}+\frac{a^5}{5b^5}+\ldots=\frac{1}{2}\log\frac{b+a}{b-a}$.

GEOMETRY.

294. Proposed by PROF. R. D. CARMICHAEL, Anniston, Ala.

Apply the locus of $(x^2+y^2)^3=mx^3$ to the problem of finding a cube m times a given cube.

I. Solution by the PROPOSER.

Construct by points the locus of the equation. Take a value of x equal to the side of the given cube. Join the corresponding point of the curve to the origin. Denote this line by a. Construct the line numerically equal to the square root of a. Then evidently the cube of this line is mx^3; or this line is the side of a cube m times as large as the given cube.

II. Solution by G. B. M. ZERR, A. M., Ph. D.. Parsons, W. Va.

On $AB=\sqrt[3]{m}$ describe a circle. On AB lay off $AQ=x$, the edge of the given cube. At Q, erect a perpendicular intersecting the circle at P. Let $PQ=y$. Then since $AP^2=\sqrt[3]{(m)}AQ$, we have $x^2+y^2=\sqrt[3]{(m)}x$, and, therefore. $(x^2+y^2)^3=mx^3$. Hence, the cube on AP is always m times the cube on AQ.